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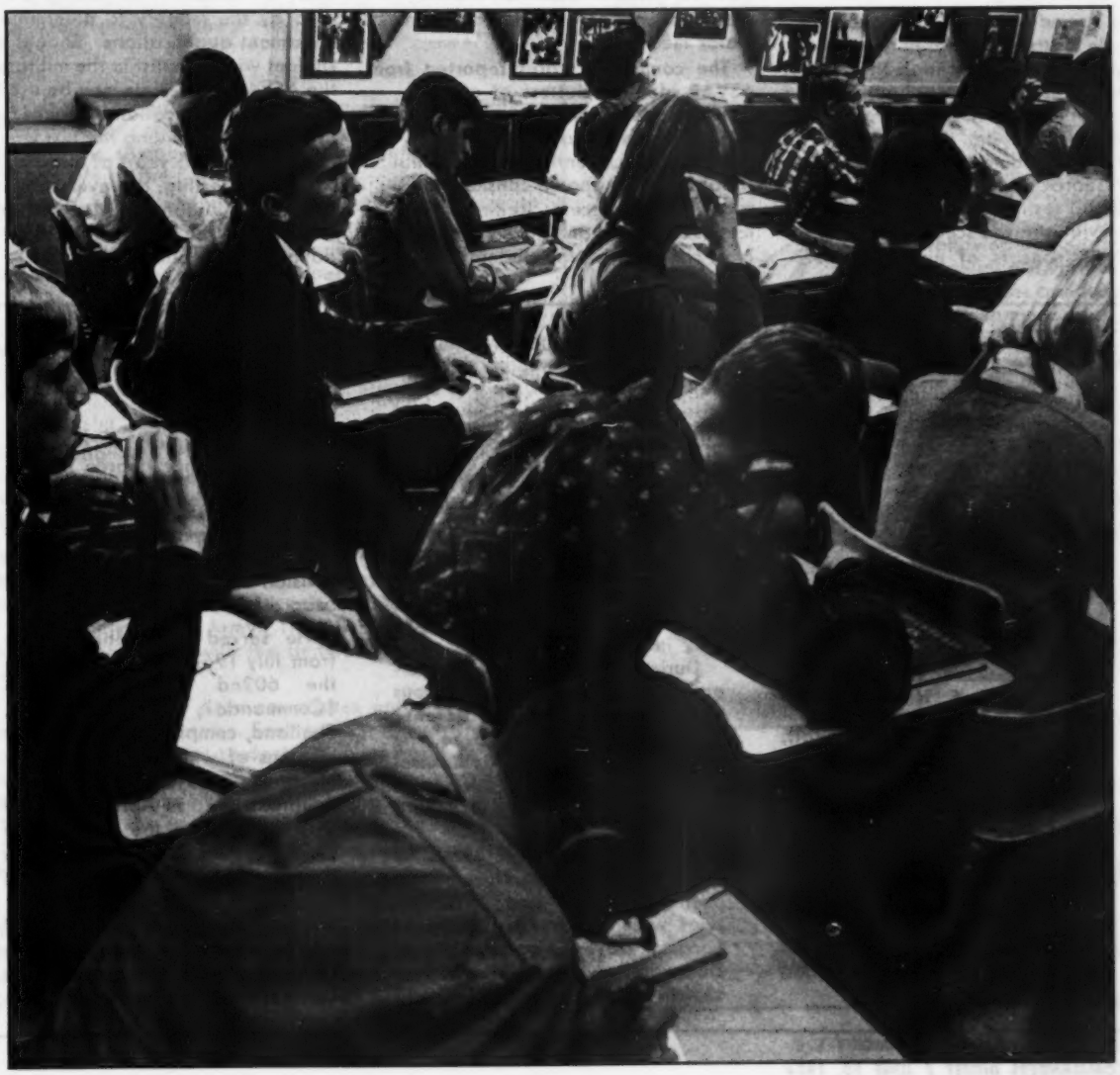
AFVTG testing youth for tomorrow's vocations



AFVTG – Testing Youth For Tomorrow's Vocations

The Armed Forces Vocational Testing Group (AFVTG) was established in March 1973 at Randolph Air Force Base, Texas, to establish policy and provide staff supervision for the High School Testing Program.

Specifically, AFVTG produces, researches, disseminates and directs administration of the Armed Services Vocational Aptitude Battery (ASVAB).

The group is a joint-services agency under the functional control of the Air Forces' Air Training Command. Commanded by an Air Force colonel, it is staffed by 55 military and civilian employees detailed from the Army, Navy, Air Force, Marine Corps and Coast Guard.

The Armed Services Vocational Aptitude Battery is offered free of charge to secondary schools throughout the United States at no obligation to the student. Professionally trained personnel administer the tests, and all materials, including guidance manuals and research material germane to vocational testing and aptitudes, are are provided to the schools.

ASVAB consists of nine subtests: coding speed, word knowledge, arithmetic reasoning, tool knowledge, space perception, mechanical comprehension, shop information, automotive information and electronics information. Results of the subtests are translated into five aptitude clusters: general-technical, clerical, electronics, general mechanics, and motor mechanics.

The composite scores reported from ASVAB identify clusters of abilities which are relevant to success in particular job areas. The student's higher scores identify occupational areas he or she should consider for probable job success. As Armed Services occupations are closely related to most civilian jobs, the student's score can be used as a valuable guidance and counseling tool. All scores are reported in percentile form.

The ASVAB is the result of more than 30 years of research in occupational testing and classification by the Military Services. Research for the battery is conducted by the Air Force Human Resources Laboratory, Army Research Institute for the Behavorial and Social Sciences, and the Navy Personnel and Training Research Laboratory.

In addition to providing the guidance counselor a useful tool, and giving the student an idea of the vocational field in which he or she is most likely to succeed, the results are also used by the military to determine enlistment qualifications. Should a student wish to enlist in the military, the ASVAB test results may be used to determine qualification in lieu of further testing, providing the test was taken within two years of enlisting. Additional testing, however, may be required should the enlistee wish to enter a field requiring technical or advanced schooling.

Col. R. S. Hoggatt

Colonel Ralph S. Hoggatt, USAF, is the commander of the Armed Forces Vocational Testing Group (AFVTG). He assumed command of the AFVTG on March 15, 1973. He is responsible for the management, supervision, direction, and operation of the Department of Defense High School Recruiting and Testing Program throughout the United States.

Colonel Hoggatt was born in Marshalltown, Iowa, on July 23, 1924. In May 1944, he was commissioned a second lieutenant through the Aviation Cadet Program.

He received his bachelor of arts degree at the University of Colorado in August 1949. He then attended graduate school and worked as Assistant Director of Veteran's Affairs at the university until he was recalled to active duty in April 1951.

During the next four years, Colonel Hoggatt served in various capacities in the Air Defense Command. During 1955-56, he was the chief of the Air Control Center, 314th Air Division, 5th Air Force (Advance), Osan Air Base, Korea.

From 1956 through 1962, he served as aircraft commander, training officer and instructor pilot with Military Air Transport Service, Dover Air Force Base, Delaware, where he was responsible for directing the C-133 heavy transport training unit for the 1st and 39th Air Transport Squadrons, 1607th Air Transport Group.

Colonel Hoggatt received a master of science degree in psychology from Oklahoma State University in 1964 and worked as a research psychologist and chief of the Specialty Knowledge Test Division of the Air Force Personnel Laboratory until 1967.

He served in Southeast Asia from July 1967 to April 1968 with the 602nd Fighter Squadron (Commando), Udorn Air Base, Thailand, completing 204 combat missions of which 102 were over North Vietnam. He returned from Southeast Asia in April 1968 and was assigned to the Air Staff as Chief of the Special Analysis Branch, Directorate of Personnel Planning, DCS/P. From 1971 through 1973 he served as Chief of the Personnel Research Division, Air Force Human Resources Laboratory (AFSC).

Vocation Test Identifies Students' Strongest Aptitude Area

The Armed Services Vocational Aptitude Battery (ASVAB) score report provided to counselors shows separate scores on the nine tests in the battery, and five aptitude composite scores.

The aptitude composites (general-technical, clerical, electronics, general mechanics, and motor mechanics) are formed from combinations of the nine test scores, and are designed as composite measures relevant to success in clusters of occupations. The aptitude composites reported to schools are not identical with the classification composites of any one of the Services, but are highly related to all of them.

It is anticipated that the counselor will wish to use the aptitude composites to identify the student's strongest aptitude area; this, in turn, can serve to guide the student in exploration of the occupations for which that aptitude is relevant.

Scores on the nine tests of the battery are reported for those counselors who wish to use them in counseling students about their areas of greatest weakness.

The five aptitude areas are described below:

General/Technical—describes the student's ability for occupations requiring academic ability. The composite is composed of verbal and mathematical components of the battery.

Clerical—describes the student's ability relevant to clerical and administrative occupations. The composite is composed of the battery components concerned with verbal ability and clerical speed and accuracy.

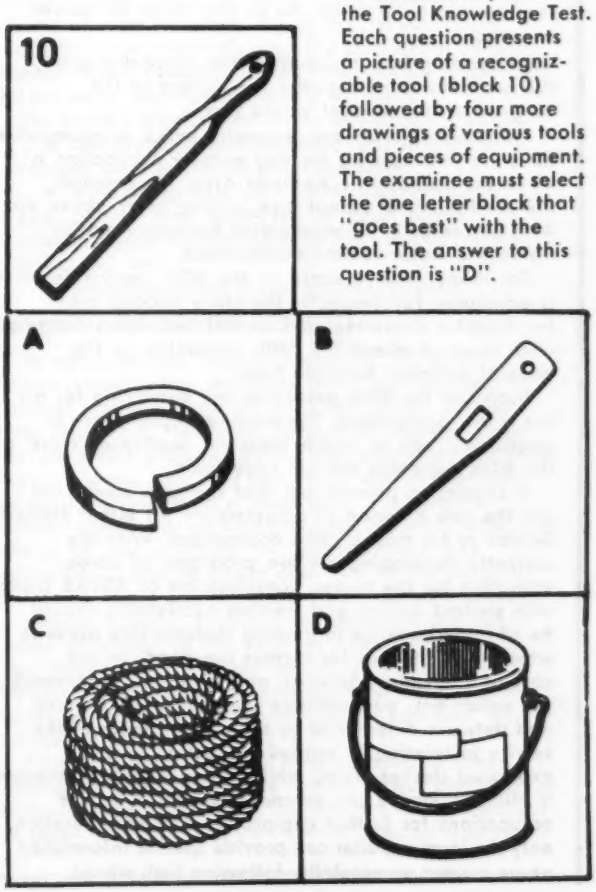
Electronics—describes students in terms of abilities relevant to electrical and electronic occupations. The composite consists of tests dealing with electrical information and with understanding of mechanical principles.

General Mechanics—describes ability in terms of those capabilities relevant to a variety of mechanical and trade jobs. The composite consists of tests assessing shop information and spatial ability.

Motor Mechanics—This composite is concerned with ability for engine repair and other related jobs. It is composed of measures of automotive information and understanding of mechanical principles. This composite is used mainly by the Army. The Air Force and Navy select for these jobs with the general mechanics composite.

Both the Aptitude Area composites and the nine test scores are percentiles. Each score indicates the relative ranking of the student, in given Aptitude Area, as compared with other young men and women. For example, a percentile score of 65 is the score which 65 percent of the group failed to attain and which 35 percent exceeded. A score of 50 is the average; half do better, half do not do as well.

The percentile scores for the Aptitude Areas are based on testing of young men and women across the Nation. This base for the Aptitude Area scores should be kept in mind by the counselor. The percentile scores show how the student compares with other young



This is an example of the Tool Knowledge Test. Each question presents a picture of a recognizable tool (block 10) followed by four more drawings of various tools and pieces of equipment. The examinee must select the one letter block that "goes best" with the tool. The answer to this question is "D".

Navy Lieutenant Kathy Moll, Chief of the Armed Forces Vocational Testing Group Publications Branch, coordinates the printing of one of many publications developed by the group to explain the Armed Services Vocational Aptitude Battery to the student, counselor and parent.

people throughout the country. They do not necessarily indicate his standing among the students in his local school or community. A student who obtains a percentile score of 60 in a given Aptitude Area is above the national average of 50. If the school percentile average is also 60, the student would be only average for his school. For some jobs, the student might be in competition only with his classmates; for other jobs, he might be in competition with young people from the community at large. Among his or her classmates the student would be average; in the community at large, he or she could be above average.

In deciding how to interpret the percentile score, the counselor must consider the caliber of the competition the student would face.

Normally, the lowest percentile which is acceptable for entry into training for any military occupation is 40 in the appropriate Aptitude Area. For example, the Air Force will accept men scoring at or above the 40th percentile in the mechanical Aptitude Area for training in motor vehicle maintenance.

For many skills a score at the 50th percentile level is adequate. For example, the Navy accepts men for hospital corpsmen and dental technician training who score at about the 50th percentile in the general technical Aptitude Area.

Scores at the 60th percentile are qualifying for all but a few occupations. The major exceptions are in electronics jobs in which minimum qualifying score at the 80th percentile are not uncommon.

It should be pointed out that aptitude scores are not the sole criterion of acceptability for either Military Service or for most civilian occupations. With the currently developing civilian programs of career education for the trades, consideration of ASVAB along with student desires and training availability should be of material value in guiding students into areas in which their chances for success are good. In the case of the Military Services, an individual's acceptance for enlistment, and ultimate assignment to training and duty are determined by the current needs of the service in relation to aptitude, experience, and expressed desires. Thus, while young people interested in Military Service can be counseled about service occupations for further exploration and consideration, only the local recruiter can provide specific information about current acceptability following high school.

DEVELOPMENT OF ASVAB

Test items contained in the first form of the ASVAB were selected from an item pool consisting of all items contained in the service classification batteries used in the "interchangeability" study, with the exception of coding speed. Criteria for item selection were difficulty level (proporiton of examinees responding correctly), discrimination level (ability of the item to discriminate correctly between individuals who score high and those who score low on the relevant ability as reflected in the item's correlation with other items of its type), and content validity.

The 25 items in each subtest (except coding speed) were arranged in approximate difficulty order so that about 85 percent of examinees would answer the first few items correctly, with the success percentage decreasing to about 25 percent at the end of each subtest.

The first form of the ASVAB was standardized on a sample of 3,050 subjects who were tested at a geographically representative sample of 11 Armed Forces Examining and Entrance Stations (AFEES). From this sample, a stratified sample, designed to be representative of the scores obtained by young people or national population on the Armed Forces Qualification Test (AFQT), was selected as a base for development of norms.

A pool of new test items was developed for use in the revision of ASVAB to test the same areas covered in the first form. During the item writing effort, new items were reviewed and critiqued by test development experts from all of the Services, and estimates of the item difficulty were made. Items were developed in numbers greater than the quantity needed for two new forms of the battery to allow for discard to those which did not meet item selection standards after empirical tryout.

The new items in the pool were arranged into experimental test booklets on the basis of type and estimates of their difficulty and were administered to samples of young people at a representative sample of examining stations. Following this tryout, the items were analyzed to determine their difficulty and their correlation with other items of their type. From among those items surviving this analysis, two parallel forms of ASVAB were developed, using the same procedures for standardization as those previously employed.

Background

The Search for A Common Test

In early 1966, the Assistant Secretary of Defense for Manpower and Reserve Affairs directed the services to explore the feasibility of a common aptitude test battery which could serve as an instrument for counseling high school students on vocational choices, could provide appropriate Military Service qualification data, and could be used in making job classification decisions about military enlistees.

A working group, consisting of personnel test experts from all of the Military Services, was set up to study feasibility of such a test battery and to develop a prototype. The Armed Services Vocational Aptitude Battery (ASVAB) was developed from this effort. Test and measurement experts from the Army Research Institute, the Air Force Human Resources Laboratory, and the Naval Personnel and Training Research Laboratory all contributed significantly to this developmental work. All of the Services have engaged in this research over the past three decades through these research laboratories and the aptitude testing movement was pioneered by them.

The battery development study was directed toward:

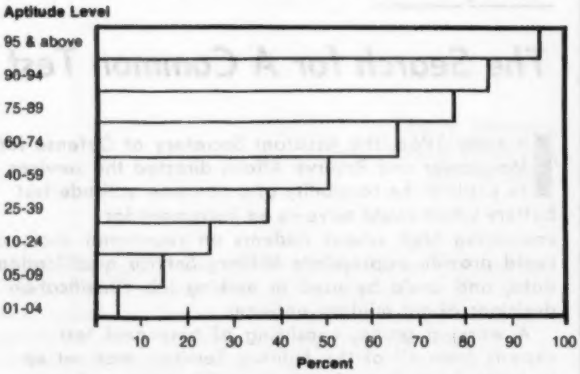
- Identifying interchangeable tests within the existing services classification batteries,
- Developing tests for the joint battery from a pool of test items composed of those in the interchangeable components of the existing service batteries, and,
- Standardization of the resultant battery.

SELECTION OF BATTERY CONTENT

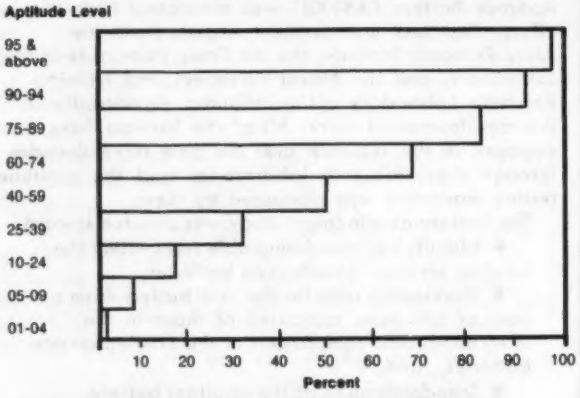
To establish test interchangeability, all of the service classification batteries were administered to a common sample made up of 3,900 basic trainees from the Army, Navy, Air Force and Marine Corps. For all 3,900 subjects, testing was arranged for three separate days, with only one of the service batteries being administered on a given day. The order of battery administration was counterbalanced to eliminate effects of test practice; i.e., each battery was administered first to about one-third of the subjects, second to about one-third, etc. From this total sample, a smaller sample, stratified to represent the full range of ability on the basis of Armed Forces Qualification Test (AFQT) scores, was selected; this statistical selection of a representative sample was necessary because of the effects of selection on the service trainee sample.

From this representative sample, interrelations among all of the tests in the various service classification batteries were established; this resulted in identification of seven content areas which were interchangeable.

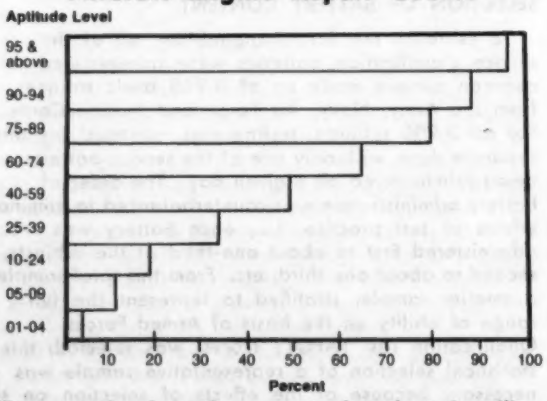
Jet Engine Mechanic's Course



Air Traffic Controller Course



Aircraft Engine Repair Course



These graphs show the percent of students in military courses expected to complete the course with an above average final grade at each aptitude level based on the ASVAB test. The validity of the ASVAB test is demonstrated by showing one selected course from three of the four aptitude areas.

Questions & Answers

How Does ASVAB aid

Commanders Digest: What is the Armed Services Vocational Aptitude Battery (ASVAB)?

Answer: It is a battery of nine tests, selected to represent "common" content among the Military Service classification batteries. It is based on over three decades of Military Service research on classification of enlisted personnel.

CD: How much time is required to administer the ASVAB?

A: Actual testing time is one hour and 52 minutes. With administration time, it requires approximately two and one-half hours.

CD: Who administers the ASVAB?

A: A trained test administrator from one of the Military Services administers the battery, and Service personnel are used to help proctor the testing. School personnel may assist in proctoring, but this is not required. No recruiting overtures are allowed in conjunction with the testing.

CD: How much will it cost to use the ASVAB?

A: Nothing. The battery is offered at no cost to the school, student, or local government.

CD: What obligation is incurred?

A: None.

CD: What ASVAB scores are reported to the school?

A: Scores on all nine tests, and five aptitude composite scores are reported. The test scores are

students and counselors?

coding speed, word knowledge, arithmetic reasoning, tool knowledge, space perception, mechanical comprehension, shop information, automotive information, and electronics information. The aptitude composite are general-technical, clerical, electronics, general mechanics, and motor mechanics. All scores and composites are reported in percentile form, and are calibrated against a national sample of youth.

CD: How long after ASVAB testing are scores reported to the school?

A: Scores will be reported approximately 30 days after testing.

CD: How can the ASVAB scores be useful to counsel students?

A: The composite scores reported from the ASVAB identify clusters of abilities which are relevant to success in particular clusters of jobs. Thus, the student's better scores identify clusters of jobs he or she should explore and consider.

CD: What do the Military Services expect to get out of the testing program?

A: The Services wish to stimulate interest in military job and training opportunities among young people, and to convey the message that Military Service is not a single occupation, but rather is an environment in which a broad variety of job skills are required, and in which valuable opportunities for training exist.

Testing Policy Stresses

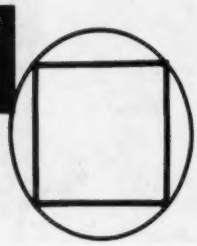
STAY IN SCHOOL

In December 1972, basic Department of Defense policy on the High School Testing Program was spelled out in a directive to the Military Services. Portions of that policy are:

- Recruiters of all of the Services must encourage high school students to stay in school and graduate, if possible, before considering Military Service. If a nongraduate seeks to enlist, the recruiter must notify the student's school and parental consent must be obtained before he can be enlisted. We believe such a policy is in the best interest of the young people, and it is clearly beneficial to the Services. The Services have found that those who persist through high school perform and progress better in their military jobs, adapt better to military life, and are less involved in behavioral problems and disciplinary actions.
- As much as possible, Service contact with schools will be planned and carried out jointly by the Military Services. This includes arrangements for testing on the Armed Services Vocational Aptitude Battery (ASVAB) and any presentations to be made at Career Day Programs.
- Since primary service interest is in ASVAB performance of high school seniors, the effort will be made to test as many as possible. However, it is recognized that test data on lower classmen is important to the counselor, and, lower classmen may be tested at the request of the school, provided seniors are also tested.
- Schools will be provided all available information on the value of the ASVAB for predicting success in civilian as well as military occupational training. A considerable amount of information is known by the Services about the relation of test scores, like those in the ASVAB, to military technical training performance. Extending this kind of information, relation to the tests to performance in some of the civilian vocational-technical programs will be established. Thus, in carrying out research studies on the ASVB, the Services will be seeking schools which are interested in having these relationships studied for their counseling program.
- When individuals who took ASVAB as high school seniors seek to enlist in one of the Military Services, within two years of having taken the test, their test results from the school testing program will be used to establish their enlistment eligibility. The school scores also will be used for establishing job guarantees to the enlistee unless the job he is seeking is one of those few which require additional qualification information. This constitutes a recognition on the part of the Services that aptitudes do not change radically over a short time and simplifies qualifying young people for some of the guaranteed job enlistment options which are currently available to them.

Today's job counselors have all but eliminated

The Square Peg in the Round Hole



Two decades ago jobs were not as variable nor as technical as today, so the placement of people in the jobs that they could fill successfully was not as difficult as it now is. In fact, there were no precise or scientific methods of deciding how or where to place people in jobs. Today's job-placement counselors have a great advantage over those in years gone by. Paper and pencil tests have been developed to determine the potential skills of individuals for future specific vocations or the achieved proficiency of technicians already on the job. These tests are the outcome of an extended and carefully applied scientific procedure. Although the process varies with the special program for which a test may be prepared, the essential features are constant.

In personnel psychology, as in the physical sciences, primary concern is with measurement and prediction. Just as engineers are concerned with the predicition of the behavior of some material object under a specified condition, psychologists are concerned with the prediction of a human under a specified condition. It might be the performance of a high school student as a college student or as a motor mechanic two or three years later. In both areas, problems typically are solved by application of the scientific method—that is, the statement of the problem; the setting up of hypotheses or theories; the quantification of these hypotheses; and verification or rejection of the hypotheses by empirical tests.

However, the subject matter of personnel psychology —the behavior of people at work—differs from the subject matter of the physical sciences in certain clear cut ways. One major difference lies in the fact that most human behavior is not directly measurable. One cannot tally directly the amount of intelligence, or aptitude, or leadership ability possessed by any person. A related problem is the unit of measurement. Few meaningful psychological variables have an absolute-zero point; thus measurement in the yardstick or counting sense is impossible. Nor is it possible, as a rule, to develop an instrument with equal units of measurement, such as a thermometer. It cannot be said that subject X has exactly two degrees more intelligence than subject Y. However, people can be ranked in order of their demonstrated ability. An entire branch of psychology (psychometrics) is devoted to ways and means of converting rank orders into more useful types of measures.

Another problem in psychology of measurement lies in the variability within an individual. A person may not behave exactly the same tomorrow as he does today, even though placed both times in what appears to be exactly the same situation. The precise limits of behavior of any subject cannot be specified with certainty, although the probability that the behavior of a group will fall within certain limits can be specified.

Not only do individuals differ within themselves from one time to another but different persons vary greatly in their characteristics. This tends to make predictions in psychology actuarial rather than absolute.

However, psychologists can predict with considerable accuracy the behavior of a group of people in a future situation from knowledge of their behavior in the present situation. Thus aptitude for learning a skill can be measured and applied in an operational selection situation such that people who are high on the measure are likely to be successful in jobs involving that skill while persons low on the measure are likely to perform inadequately. Such predictions are valuable in industry as well as in the Military Services in the dollar savings they represent in training and other personnel costs. One of the best ways to measure how people differ in aptitudes is by means of a test. Many such texts exist today. The ASVAB is one of those developed and validated by the Military Services for predicting success in military-oriented job areas. As military jobs are related to civilian jobs, the tests are useful in counseling a student concerning the area in which he is likely to succeed or in selection for the civilian counterparts to military occupations.

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